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EXAMINER

KRAVETS, LEONID

ART UNIT	PAPER NUMBER
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2189

DATE MAILED: 08/04/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/607,772

Applicant(s)

ROYER ET AL.

Examiner

Leonid Kravets

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 27 March 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-23 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-12, 14-23 is/are rejected.
- 7) ☒ Claim(s) 13 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 27 March 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: _____

PD

DETAILED ACTION

Specification

1. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

2. The abstract of the disclosure is objected to because it is not adequately descriptive of the subject matter of the invention. Correction is required. See MPEP § 608.01(b).

3. The disclosure is objected to because of the following informalities: "While it is can be stated" (page 1, line 16) should be changed to "While it can be stated".

Appropriate correction is required.

4. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

Claim Rejections - 35 USC § 112

5. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

6. Claim 21 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not

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described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

The claimed "device option memory" is unclear.

7. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

8. Claims 1-23 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. It is unclear to the examiner what is meant by "a memory cached by a non-volatile cache". Data can be cached, but memory cannot. Furthermore, it is unclear what the "operating system cache driver" means.

9. Claims 14 and 19 recite the limitation "a memory to store an address associated with a write operation to a memory cached by the non-volatile cache" in lines 3 and 4. There is unclear antecedent basis for this limitation in the claim. It is unclear to what memory the "memory cached" is referring to in the referenced claim.

10. Claims 16 and 23 recite the limitation "the memory comprises a non-volatile memory" in lines 1-2. There is unclear antecedent basis for this limitation in the claim. It is unclear which memory is referred to.

Claim Rejections - 35 USC § 103

11. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

12. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

13. Claims 1-4, 6-10, 14, 16, 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sarkozy, (US Patent 5,732,238) further in view of Handy (the Cache Memory book, Academic Press, 1998).

As per claim 1, Sarkozy teaches a method, comprising:

Recording an address of a write operation to a memory cached by a non-volatile cache (Col 2, lines 56-63).

Sarkozy does not specifically mention that recording an address of a write operation should be done prior to executing an operating system cache driver.

However, Handy explains that disk caches are often implemented in dynamic RAM using software control. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the system of Sarkozy in the manner of Handy since this would have provided a greater level of coherency and fault tolerance by making sure that no writes are ignored.

As per claim 2, Sarkozy teaches the method of claim 1, wherein recording the address of the write operation further comprises:

Recording the address in a log (Col 2, lines 64-65)

As per claim 3, Sarkozy teaches the method of claim 2, wherein the log is stored in a memory comprising at least one of a static random access memory, a dynamic random access memory, a flash memory, and a polymer ferroelectric RAM (Col 13, lines 34-36).

As per claim 4, Sarkozy teaches the method of claim 1, further comprising detecting a write operation (Col 3, lines 1-2).

As per claim 6, Sarkozy teaches the method of claim 1, further comprising:

Modifying data corresponding to the address of the write operation (Col 3, lines 9-13).

As per claim 7, the method of claim 6, wherein modifying the data corresponding to the address of the write operation further comprises:

Updating the data corresponding to the address of the write operation.

In Sarkozy, as in all systems, modifying data updates the data.

As per claim 8, Sarkozy teaches the method of claim 6, wherein modifying the data corresponding to the address of the write operation further comprises:

Invalidating the data corresponding to the address of the write operation
(Col 3, lines 34-37).

As per claim 9, please see rejection of claim 1 above. Sarkozy claims an article comprising a machine-accessible medium having associated data, wherein the data, when accessed results in a machine performing:

Recording an address of a write operation to a memory cached by a non-volatile cache prior to executing an operating system cache driver (Col 2, lines 56-63)

As per claim 10, Sarkozy discloses the article of claim 9, wherein the data, when accessed, results in the machine performing:

Recording the address of the write operation in a log (Col 2, lines 64-65).

As per claim 14, Sarkozy teaches an apparatus, comprising:

A non-volatile cache (Col 2, line 41); and

A memory to store an address associated with a write operation to a memory cached by the non-volatile cache (Col 2, lines 56-63) prior to booting an operating system cache driver (See claim 1 rejection).

As per claim 16, though there is unclear antecedent basis for the memory specified in the claim, examiner's broadest reasonable interpretation of this claim will be applied, in accordance with Ex Parte Ionescu as per the following guideline. A claim limitation which is considered indefinite cannot be disregarded. If a claim is subject to more than one interpretation, at least one of which would render the claim unpatentable over the prior art, the examiner should reject the claim as indefinite under 35 U.S.C. 112, second paragraph (see MPEP § 706.03(d)) and should reject the claim over the prior art based on the interpretation of the claim that renders the prior art applicable. Ex parte Ionescu, 222 USPQ 537 (Bd. Pat. App. & Inter. 1984) (Claims on appeal were rejected on indefiniteness grounds only; the rejection was reversed and the case remanded to the examiner for consideration of pertinent prior art.). Compare In re Wilson, 424 F.2d 1382, 165 USPQ 494 (CCPA 1970) (if no reasonably definite meaning can be ascribed to certain claim language, the claim is indefinite, not obvious) and In re Steele, 305 F.2d 859, 134 USPQ 292 (CCPA 1962) (it is improper to rely on speculative assumptions regarding the meaning of a claim and then base a rejection under 35 U.S.C. 103 on these assumptions).

Sarkozy discloses the apparatus of claim 1, wherein the memory comprises a non-volatile memory (Col 2, lines 56-58).

As per claim 19, see rejection of claim 1 above. Claim 19 is rejected for similar reasons.

14. Claims 5 and 17-18, 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sarkozy in view of Handy as applied to claim 4 above, and further in view of Lee et al. (US Patent 5,937,433).

As per claim 5, Sarkozy teaches the method of claim 4; however, Sarkozy does not teach that detecting the write operation further comprises:

Trapping an interrupt request

Lee teaches the use of interrupt requests to detect write operations (Col 6, lines 6-8). The Lee and Sarkozy systems are compatible since they are in the same field of endeavor, namely cache control. It would have been obvious to a person of ordinary skill in the art at the time the invention was made to combine Lee with Sarkozy in order to properly detect write operations, since this would have been the proper handling of input/output requests in a computer system, and thus more efficient.

As per claim 17, Sarkozy discloses the apparatus of claim 14; however, he does not disclose a module to receive an interrupt request associated with the write operation.

Lee teaches the use of interrupt requests to detect write operations (Col 6, lines 6-8). Please see rejection of claim 5 above.

As per claim 18, Sarkozy and Lee disclose the apparatus of claim 17; Lee further discloses the interrupt request is a basic input-output system int13h request (Col 6, lines 6-7).

As per claim 20, please see rejection of claim 17 above.

15. Claims 11 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sarkozy in view of Handy as applied to claim 10 above, and further in view of Howard (US Patent 6,629,198)

As per claim 11, Sarkozy discloses the article of claim 10; however, he does not disclose that the log is included in a non-volatile memory.

Howard discloses that the log can be included in a non-volatile memory (Col 4, lines 42-43). The Sarkozy and Howard systems are compatible since they are in the same field of endeavor, namely data storage. It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine Sarkozy with

Howard to use a non-volatile log, allowing for recovery from a network or disk failure (Col 5, lines1-2).

As per claim 23, Sarkozy discloses the system of claim 19; however, he does not disclose that the memory comprises a non-volatile memory to store a log including a plurality of memory addresses including the address of the write operation

Howard discloses that the log can be included in a non-volatile memory (Col 4, lines 42-43) and that the log includes a plurality of memory addresses including the address of the write operation (Col 2, lines 12-14). The Sarkozy and Howard systems are compatible since they are in the same field of endeavor, namely data storage. It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine Sarkozy with Howard to use a non-volatile log, to allow for recovery from a network or disk failure (Col 5, lines1-2).

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16. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sarkozy in view of Handy as applied to claim 10 above, and further in view of Heemels (US Patent 5,603,331).

As per claim 12, Sarkozy discloses the article of claim 10; however, Sarkozy does not disclose the article wherein the data, when accessed, results in the machine performing:

Setting a flag to indicate an overrun of the log.

Heemels teaches setting a flag to indicate an overrun of the log (Col 9, lines 62-65). It would have been obvious to one having ordinary skill in the art at the time the invention was made to combine Sarkozy with Heemels, adding the overfill flag of Heemels to the device of Sarkozy in order to provide for data integrity in the log. Heemels provides this motivation by indicating the flag would prevent the overrun of the log data array.

17. Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sarkozy in view of Handy as applied to claim 14 above, and further in view of PC Guide.

As per claim 15, Sarkozy discloses the apparatus of claim 14; however he does not disclose that the address is a logical block address. According to a definition in PC Guide (Logical Block Addressing), LBA addressing is the dominant form of hard disk addressing. PC Guide shows that the motivation for using LBA is to allow for large hard disks that would otherwise not be supported by the BIOS. One of ordinary skill in the art would have found it obvious at the time the invention was made to combine Sarkozy

with the LBA definition in PC Guide in order to provide large hard disk compatibility for the apparatus of claim 14.

18. Claim 22 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sarkozy in view of Handy and Lee as applied to claim 20 above, and further in view of PC Guide.

As per claim 22, Sarkozy discloses the system of claim 20. Sarkozy does not disclose that the module of claim 20 is included in a basic input-output system. According to PC Guide, (BIOS Functions and Operation), a basic input-output system handles interrupts. Thus, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to combine the module receiving interrupt requests associated with write operations into the BIOS.

Allowable Subject Matter

14. Claim 14 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

Conclusion

17. The following is text cited from 37 CFR 1.111(c): In amending in reply to a rejection of claims in an application or patent under reexamination, the applicant or patent owner must clearly point out the patentable novelty which he or she thinks the claims present in view of the state of the art disclosed by the references cited or the objections made. The applicant or patent owner must also show how the amendments avoid such references or objections.

18. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

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19. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Leonid Kravets whose telephone number is 571-272-2706. The examiner can normally be reached on M-F, 8-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matthew Kim can be reached at (571)272-4182. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

LF

Leonid Kravets
Patent Examiner
Art Unit 2189

July 28, 2005



BEHZAD JAMES PEIKARI
PRIMARY EXAMINER